

S h e l l f i s h C o m m i t t e e

1965

By P. KORRINGA

MOLLUSCA

Belgium

(E. Leloup)

Oysters

Continuation of the study on the growth rate of the oysters cultivated in the sluice-dock (bassin de chasse) at the port of Ostend.

Mussels

As during previous years, investigations were carried out on the mussels living along the Belgian Coast in order to ascertain the degree and the evolution of the infection of the mussels by the parasitic copepod Mytilicola intestinalis.

France

(L. Marteil)

Huîtres

Croissance et reproduction des huîtres plates et portugaises ont été étudiées dans les divers centres de production en fonction des conditions hydrologiques et des modes d'exploitation.

La croissance d'O. edulis a été bonne, notamment en Bretagne-sud; celle de Cr. angulata a été généralement médiocre, particulièrement dans les secteurs de Marennes et d'Arcachon en raison des températures insuffisantes du printemps ou de l'été.

Les températures anormalement basses de l'été en Morbihan ont fortement contrarié l'évolution des huîtres plates dans les mois de juin et de juillet; les fixations ont été exceptionnellement faibles dans cette région. La reproduction des huîtres portugaises a donné des résultats jugés satisfaisants dans la région de Marennes et en Gironde mais très mauvais dans le bassin d'Arcachon.

L'expérimentation de nouveaux modèles de collecteurs en matière plastique et les essais d'élevage d'huîtres en casiers, en poches de grillage, en mer libre ou en marais ont été poursuivis.

Moules

L'évolution des larves de Mytilus edulis a été médiocre dans la région mytilicole de la Rochelle mais de bonnes fixations ont eu lieu en divers points de la côte de la Manche (baie de St.-Brieuc) et de l'Atlantique (Vilaine et Noirmoutier).

La distribution de Mytilicola intestinalis le long des côtes françaises a fait l'objet d'une carte; le parasite est particulièrement répandu dans les secteurs où la moule est intensivement cultivée.

Coquilles St.Jacques

L'étude du stock de Pecten maximus a été entreprise en baie de St-Brieuc par le navire de recherches "Roselys". La population était essentiellement composée de mollusques âgés de 1 à 4 ans. Des marquages ont été effectués.

Bactériologie des coquillages

Des études comparatives ont été faites sur la fréquence des streptocoques du groupe D et d'E. coli ainsi qu'entre les méthodes de numération bactérienne de Vincent et de Mackensie. Il apparaît que les streptocoques résistent mieux au milieu marin qu'E. coli et qu'ils s'éliminent plus difficilement des coquillages.

La méthode de Vincent, détectant en outre certains paracoli-bacilles, donne des résultats légèrement supérieurs à ceux de la méthode de Mackensie plus spécifique d'E. coli.

Germany

(P.F. Meyer-Waarden)

Mytilus edulis

Routine investigations on the growth and quality of wild and cultivated mussels and observations on the infection rate with Mytilicola intestinalis have been continued at the Institut für Küsten- und Binnenfischerei. 26 samples were analysed.

Ireland

(F.A. Gibson)

Oysters

A field station was established at Fenit, Co. Kerry. This was and will continue to be the focal point for a comprehensive study of the oyster stocks in Tralee Bay. Spat collectors were positioned in various parts of the oyster grounds and a quite heavy spatfall was recorded. Areas of excellent spatting success but high mortality as 1 and 2 year old oysters were located. Many of these will be transplanted in areas where survival to marketable size is more assured.

Mussels

Further transplantations of mussels were undertaken on the south-west coast, using a mechanised dredger for the purpose.

Problems associated with the spawning and settlement of mussels on the east coast were studied.

Netherlands

(P. Korringa)

Oysters

The limited number of French oysters relaid in the Oosterschelde, in combination with poor weather conditions and low water temperatures, led to a complete failure of setting in the year 1965.

Relaid Portuguese oysters could not spawn due to low water temperatures and hence developed a rather poor flavour.

In December an unusually strong run-off of the river Rhine led to exceptionally low salinities (about 20 ‰) in the Oosterschelde and hence to weak and dying oysters in the storage ponds at Yerseke.

Norway

(K.R. Gundersen)

Mussels

Mytilus edulis was very common in the middle part of the Sognefjord, especially on steep rock beaches, living from a little below high tide level to 2-3 metres downwards in a vertical direction. Most of the mussels were under commercial size, and the majority of those living at or above mean sea level is destroyed every winter. In the innermost part of the fjord, a top layer of very brackish water forces the spat to settle well below low tide level.

In the Oslofjord, the meat content of mussels has been analysed on a monthly basis, and weekly samples have been taken there during the period April-November to ascertain the mytilotoxin content (PSP). The PSP was found during May-June, but only in relatively low concentrations.

At the Institute in Bergen, experiments were started on the cleansing of mussels contaminated with fuel oil (diesel, solar) in the harbour area. At the beginning of the experiments, the meat, both raw and boiled, had a very strong smell and taste of oil. After three weeks in running sea-water at salinities of 30-35 ‰, and temperatures from 5 to 20°C, the taste decreased considerably in intensity, but later on remained constant for more than three months. The experiments are continued.

Modiola modiolus

In November-December some 12 tons of this bivalve were fished near Bergen for a processing and canning experiment. Because of the severe winter considerable difficulties were encountered during fishing, since Modiola is very sensitive to frost. Until delivery to the plant, the mussels were kept in wooden boxes in sheltered bays, well below low tide level, for periods up to two months.

Experiments with cultivation of mussels on ropes suspended from rafts are under preparation. Blocks of porous plastics will be used as floats.

Mya arenaria

During May-August the western and southern coasts of Norway were surveyed for stocks of commercial bivalves of economical importance. Moderate stocks of Mya arenaria, 50-100 or more specimens per square metre, were found in some bays in the Sognefjord, on the west coast, the size of the largest beds, exposed at low tide being from 3000 to 1-2 millions square metres. Exploitation will, however, be difficult, because the clams live in a very viscous clay of glacial origin.

Portugal

(H. Vilela)

Oysters

Routine observations on spatfall of Oysters (Crassostrea angulata) in the Sads and Tagus estuary were continued in 1965. Experiments with collectors for oyster spat were carried out. The sanitary control of oysters was continued.

Mussels

The studies on the infestation of mussels and other bivalves with Mytilicola intestinalis and Trematodes were continued.

Spain

(J. Cuesta)

Huîtres

La ponte et les larves d' Ostrea edulis, Ostrea plicata et Crassostrea angulata ont été étudiées dans le N.O. d'Espagne.

Dans la région du Santander des essais de repeuplement ostréicole ont été effectués.

Palourdes

Des études sur la croissance relative de Tapes decussatus ont été continuées.

Coquilles St. Jaques

Des études biométriques et biologiques, et particulièrement des études concernant la maturation sexuelle de Pecten maximus, ont été exécutées dans les eaux côtières dans le N.W. d'Espagne.

United Kingdom

I. England and Wales

(H.A. Cole)

Oysters

At the shellfish rearing unit the main effort was concentrated on producing spat of Ostrea edulis for experimental purposes, principally to test the food value of a wide variety of algal species. The concentrations of these necessary for optimum growth have been studied. Mixed algae seem to give better growth than single species and experiments with controlled mixtures are yielding promising results.

The standard technique has been to culture about 100,000 larvae in 75 litre polythene bins but larvae have been cultured successfully at much higher densities by a new technique where 4-500,000 larvae are maintained in glass-tubes 10 cm in diameter and 80 cm long, holding only 12 litres of water.

Experiments with O. lutaria confirm the impression gained in 1964 that the spat grow more slowly than those of O. edulis. Spat of Crassostrea gigas have been reared successfully and have grown well. Their resistance to winter conditions is now being tested.

On the east coast of England natural spatfall was again a failure but in the south west it was moderate.

By retaining small Norwegian oysters in storage pits most of them were grown to a size suitable for relaying in open water after one season.

Turbidity estimations in east coast rivers have shown that silt loads do not customarily reach levels likely to interfere with larval development though there are times when the normal functioning of adult oysters will be impeded.

The quality and condition of Crassostrea angulata grown at various tidal levels is virtually the same up to 50 % exposure but yield, in terms of growth and reduced losses, is greatest at or just below L.W.E.S.T.

Further studies of air-stored oysters have shown marked increases in the numbers of faecal streptococci which cannot therefore be regarded as suitable indicators of pollution. Oysters examined for viruses showed very low levels even in areas where these were plentiful in the sewage discharged. Because of the low rate of infection purification tests to determine rates of removal could not be conducted.

Mussels

Mytilus edulis

Comparisons of growth rates in different areas have been made but the main work has been concerned with the problems of relaying sub-littoral brood on intertidal beds. These mussels are much lighter than the littoral ones and tend to wash away as well as being more easily preyed upon by Carcinus maenas. There appears to be a correlation between the minimum size of mussel resistant to crab attack and the original tidal exposure level of the mussels.

Experiments with various types of seed collector have been continued and a study made of settlement on the Conway beds. The main spatfall took place in July with small sets in June and August. On the beds survival was poor and very few seed remained after three months.

Cleansing techniques continue to be studied and it has been shown that because the rate of uptake of chlorine is so rapid, "hypo" need not be added to the cleansing tanks. Other techniques for reducing handling during the cleansing procedure are being studied.

Comparisons have been made of various methods for estimating sanitary quality and a sensitive M.P.N. technique for estimating low level pollution in purified mussels shows promising results.

Shellfish stored in water containing diesel oil became tainted. The degree of tainting appeared to be a function of concentration and exposure time. Over two months retention in clean running seawater was necessary to eliminate the taint.

Experiments with Mytilicola have shown that the adults, including egg-carrying females, will leave host mussels and that small individuals can reinfect the host. Chlorine at low concentrations will destroy the larvae but the adults, and particularly the eggs, are very resistant. Initial concentrations of 100 p.p.m. and 24 hours exposure are necessary to give a 100 % kill of the latter at 20°C.

Cockles

Cardium edule

Routine surveys of the Burry Inlet have been continued to provide information on stocks to be used in conjunction with the oystercatcher-control programme and for regulating the fishery. The 1965 settlement, though not as good as in 1963, was still better than for many other years. Oystercatcher predation was less serious than usual because the cockle stock was so much bigger.

Experimental thinning of the cockles in various ways has shown that where population density is high spatfall is lower, losses greater, growth is poorer and meat yield is reduced.

In Morecambe Bay, spatfalls have been poor and there is no indication of a recovery to commercially exploitable densities. Oystercatchers present in the bay still take cockles but feed principally on Macoma and Mytilus.

In the Burry Inlet experiments on the use of cannon nets and other methods for controlling the birds have been temporarily halted because of the difficulty of obtaining access to the roosting areas.

Clams, Venus (Mercenaria) mercenaria

Rearing techniques similar to those used for oysters have been applied successfully. In particular high density culture in vertical glass-tubes has yielded good results. Spat-feeding experiments with a variety of algae have been conducted and growth rates studied. It appears that spat would have to be retained in protected conditions for at least two years before being big enough to withstand predation by Carcinus.

Studies in Southampton Water have continued. Though there is still a large natural population there has been no really successful spatfall since 1961.

Heavily polluted clams will only cleanse satisfactorily in a 48-hour period if kept at a water temperature above 13°C. Experiments on methods of handling during cleansing and of storage have made it possible to draw up specifications for a commercial cleansing plant.

Escallops, Pecten maximus

Surveys of stocks and their distribution have been made off the Farne Islands and part of the Devon coast. In addition a general study of scallop fishing in England and Wales has been made and samples collected for routine studies particularly seasonal changes in the gonads.

II. Scotland

(R.H. Millar and H.J. Thomas)

Oysters

Ostrea edulis L.

Laboratory experiments have continued on problems of the physiology of oyster larvae, arising from studies on the improvement of artificial breeding techniques.

Field experiments have started on methods of oyster culture with rafts, with laboratory-bred spat, in the first place, but later aimed at growing oysters to market-size by suspended culture.

Scallops

Pecten maximus L.

Laboratory and field experiments have been started to investigate methods of cultivation of the scallop. Artificial breeding has succeeded and spat were obtained, but larval mortality is still high. Transplantations of adults have been made and experiments are in progress to investigate the effects of growing at varying densities and on different soils.

Data on catch per unit effort of escallops have been maintained in the Firth of Clyde. Preliminary examination of these and research-ship data suggest no decline in the catch per unit effort in the stocks of the west side, where three-ringed escallops sometimes predominate in catches. A slight decline might have occurred in the east, however, where the stocks were generally older and 5- and 6-ringed escallops were more abundant in the catches. Sampling of escallops has also been undertaken on other grounds off the west coast.

Cockles

Cardium edule

Further surveys have been made of the cockle beds at Barra. The main cockle area lies high up on the shore. A transplantation experiment has been carried out. After two months, of the cockles transplanted to about low water neaps 50 % has survived and grown more rapidly than those remaining on the upper shore.

Cephalopoda

Records have been maintained of the commercial landings of squid. The data suggest that the autumn influx into coastal waters in 1965 was somewhat greater than the very low level of the previous two years. The commercial catch comprised Loligo forbesii of mean size about 14 cm overall length. In above 10 cm the sexes were about equally represented but the catches were composed almost entirely of immature specimens.

CRUSTACEA

Belgium

(E. Leloup)

Crangon crangon

The biological study of shrimps was continued. Its aim is to ascertain the annual evolution of the stock of shrimps on the Belgian coast.

Denmark and Greenland

(Aa, J.C. Jensen & E. Smidt)

Homarus vulgaris

In the spring of 1965 investigations were carried out on an unusual mortality among lobsters in the Limfjord, North Sea and Skagerrak.

Nephrops norvegicus

Investigations on length and sex of Nephrops were carried out in the northern and central North Sea, Skagerrak and Kattegat. At the same time tagging was carried out in the Skagerrak.

Pandalus borealis

Length and maturity of Pandalus were investigated in the North Sea and the Skagerrak simultaneously with the work on Nephrops.

In Greenland waters the annual trawling experiments on prawn grounds in the Godthåb district have been continued in 1965. They are to be continued in 1966, and, besides, some trawling experiments with R/V "Dana" are planned for the Davis Strait.

Chionoecetes opilio (Greenland crab)

In 1965 some trawling experiments with a special crab trawl have been carried out on prawn grounds in the Godthåb district. Continuation of this work, including fishing experiments with the crab trawl in the Disko Bay, is planned for the year 1966.

Finland

(S.G. Segerstråle)

Crangon crangon

Studies on the biology of Crangon crangon were made by A. Petäjä of Turku University.

France

(L. Marteil)

Homarus vulgaris et Palinuris vulgaris

De nombreux marquages de ces crustacés ont été faits sur la côte bretonne.

Nephrops norvegicus (Langoustines)

Deux campagnes du "Roselys" ont été faites, en avril et en septembre, pour étudier le stock de langoustine du Golfe de Gascogne entre Penmarc'h et l'Ile de Groix ainsi qu'autour de l'Ile d'Yeu et du plateau de Rochebonne. Des lots provenant de la Mer du Nord (Farn Deep et Skagerrak) ont également été examinés.

Cancer pagurus

Une étude du stock de ce crabe est en cours dans le nord et le centre du Golfe de Gascogne.

Germany

(P.F. Meyer-Waarden)

Crangon crangon

The investigations of the Institut für Küsten- und Binnenfischerei to assess the share of undersized protected fish in the catch of the German shrimp fishery, and the fluctuations in the abundance of fish species found on the shrimp fishing grounds, have been continued. In the year under report 429 samples (= 1,895 kg) of unsorted catch of the shrimp fishery were collected in Büsum, Cuxhaven, Neuharlingersiel und Dornumersiel and analysed as to their species and length composition.

The shrimp tagging experiments were continued at the Institut für Küsten- und Binnenfischerei. 8,250 shrimps were tagged with coloured plastic tags by the silver ring method from Cuxhaven and Büsum in summer and autumn.

The investigations on the distribution of shrimp larvae in relation to hydrographic factors along the German coast have been continued at the Institut für Küsten- und Binnenfischerei. During March, April, May, June, July, August, September and October 8 cruises aboard the Fisheries Inspection and research vessel "Neptun" were made; 218 stations were visited.

Rearing experiments were carried out at the Institut für Hydrobiologie und Fischereiwissenschaft of the University of Hamburg.

Pandalus sp.

During April to October experimental fishing was carried out during 883 hours on the Fladen Ground, Farn Deep and in the Skagerrak area, in order to survey the stock on deep-sea prawns. The catch composition was roughly determined aboard and sub-samples of the crustacean catch were taken to the laboratory for detailed analysis. A series of storage and processing experiments was carried out with both raw and boiled prawns.

Iceland
(U. Skúladóttir)

Pandalus borealis

Routine sampling of prawns has been continued. In addition, the number of prawns per kg has been established since the autumn season for every boat-load brought in at one of the plants.

3250 prawns were tagged with black plastic tags. None has been recaptured the same year.

Nephrops norvegicus

Routine sampling on Norway lobsters has been continued. Reproduction in Nephrops has been studied from May till November 20th by observing the ovaries macroscopically and by measuring the diameter of the eggs attached to the abdomen.

In May 2025 Norway lobsters were tagged, partly with the blue American arrow tag, partly with blue and red plastic tags attached to the soft section at the junction of cephalothorax and abdomen. These tags should stay on after moulting.

In September 445 blue arrow tags, 2200 blue plastic tags, and 500 green Dymo-tags were attached to Norway lobsters. None has been recaptured the same year.

Ireland
(F.A. Gibson)

Homarus vulgaris

A total of 867 suture-tagged lobsters were released at Dalkey, Co. Dublin during the period February to August. All recaptures, whether moulted or not, were returned to the sea. In 1966, those at liberty for one full year will be examined in order to study annual growth rates.

Nephrops norvegicus

The third year of studying the stock of prawns on the south coast was completed and a paper on the subject is in press.

Palinurus vulgaris

Details of the size composition of the catch of crawfish on the west coast of Ireland were collected, starting in July. Particular attention was given to the development of ovaries.

Netherlands
(P. Korringa)

Homarus vulgaris

Late in December of the year 1965 an exceptional run-off of the river Rhine led to a serious drop in salinity in the Oosterschelde. Salinities of 19 and 20 ‰ were recorded.

Lobsters stored in the parks at Yerseke initially suffered quite heavy losses, but recirculation of the water and addition of extra salt could stop the trouble timely enough.

Norway
(K.R. Gundersen)

Homarus vulgaris

Tagging experiments on lobsters in aquaria were continued, and field experiments started during 1964 were continued and extended in 1965.

417 tagged lobsters were released in Tysfjord and other localities in the northern part of Norway.

In Busepollen, south of Bergen, and in Kvernhusosen, north-west of Bergen, respectively 111 and 94 tagged lobsters were released.

Cancer pagurus

Tagging experiments on Cancer pagurus were continued during 1965. The Norwegian tagging method was used. 1181 tagged crabs were released in the Hjeltefjord area, and 185 in the Byfjord area.

Portugal
(H. Vilela)

Nephrops norvegicus

Observations on the stock composition of Nephrops were continued in the year 1965.

Spain

(J. Cuesta)

Penaeus rerathurus

Des études sur les populations de Penaeus rerathurus ont été exécutées dans la région sous-atlantique espagnole.

Sweden

(B.I. Dybern)

Homarus vulgaris

Further investigations on the biology of the lobster, induced by the continuing decrease in the commercial catches, included the following items: Inventory of the catches by fishermen and others from different districts of the Swedish west coast. Tagging experiments. Frog-man studies of the lobster and its habits. Experiments with different kinds of creels.

Cancer pagurus

Frog-man studies were made on the crab and its habitat.

Nephrops norvegicus

Continued investigations of the catchability and biology of Nephrops included; Trawling experiments during day and night. Frog-man studies in nature, supplemented by aquarium experiments on the digging habits of Nephrops. Studies on the year-cycle, especially on the development of the gonads. Registration of the by-catches in commercial and research trawling.

Pandalus borealis

Experimental trawling was carried out at different depths, and in different seasons to assess the size composition of a selected population.

An inventory of the commercial shrimp fishery was made in cooperation with a number of fishermen.

The by-catches in commercial and research trawling have been recorded. Special attention was paid to some other kinds of shrimps, especially to the species of the genus Pasiphaea.

United Kingdom

I. England and Wales

(H.A. Cole)

Homarus vulgaris, Lobsters

Studies of the biology and population dynamics of the lobsters are continuing on the Yorkshire fishery. Preliminary results from tag recoveries indicate a fishing mortality of about 60 % and a total mortality of 70 %. Few tagged lobsters moved more than two miles from the release point. Catch measurements indicate little change in size composition of the stock over several years.

Moult frequency as derived from integument sectioning indicates that almost all males moult once a year in summer though a few will moult a second time in autumn. The first sectioning of females carried out in August 1965 showed that 87 % had moulted or were approaching a moult.

Requirements of oxygen, temperature and space for lobsters under storage conditions are being studied, so too is their behaviour, in relation to light and shelter.

Palinurus vulgaris, Crawfish

Extensive size measurements and other observations have been made on the Cornish stock. A commercial fishery for this species by aqualung divers has developed and became increasingly important.

The mean size of crawfish landed in the Mounts Bay area of Cornwall was less than in areas further south and west and the mean size of diver-caught males was slightly greater than those caught in pots though the sizes of females were approximately the same.

Experiments designed to discover the most suitable type of tag for use in studying local and seasonal movements of crawfish were conducted during the summer. The "Sphyrion" tag appears to be the most promising.

Cancer pagurus, Crabs

The work on the Yorkshire crab fishery was virtually completed in 1965. It has been concluded that increasing the minimum size from 111 to 127 mm would not result in a significant increase in yield. An improved method of attaching the suture tag has made it possible to greatly increase the rate at which crabs can be tagged. 3,400 tagged crabs were released in May and June 1965. The technique has permitted a new method of estimating growth rate by obtaining the mean annual increments. Recaptures have confirmed earlier observations that the female crabs move northwards over long distances but that the males remain close to their release point.

Studies of sexual maturity have shown that male crabs become ripe at 3 inches and that 90 % of those over 4.3 inches were apparently ripe. 50 % of females between 4 1/2 and 5 inches were impregnated but none less than 5 inches was found carrying eggs.

Palaemon serratus, Prawns

Experimental rearing techniques are being developed and the temperature, oxygen, food and space requirements of larvae are being studied. Optimum growth occurs at between 22 and 26°C and live Artemia nauplii proved the best food amongst those tested. The minimum volume available to each animal needs to be 50 ml in order to reduce cannibalism and total darkness too increases survival. Possible genetic differences between broods affecting their growth under the same conditions are being investigated.

Studies on adult prawns in beakers showed that they moulted on average every 20 days but there was very little significant increase in their weight.

Food conversion factors have been worked out and show an efficiency of 5-8 % on prawns fed on mussel meat.

Pandalus montagui, Shrimps

Following several years of scarcity the 1964 class on the east coast of England was very good and the fishery was re-established in 1965. Attempts to catch shrimps with a mid-water trawl were unsuccessful apparently because the considerable movements made by the animals all take place within 2 metres of the bottom.

The diurnal feeding behaviour has been studied. A close relationship has been established between the size composition and type of sand-grains in the stomach and on the bottom and this is being used to determine short-term movements of shrimps in the Rivers Crouch and Roach.

II. Scotland

(H.J. Thomas)

Homarus vulgaris

Data on landings of lobsters, catch per unit effort and catch composition have been obtained from all major fishing areas. Off the south-east coast of Scotland the catch per hundred creel hauls and the total weight of lobster landed is at its lowest level for ten years.

Routine sampling of crabs and collection of catch/effort data have been maintained in all the main fishing areas. Tagging experiments off the east coast resulted in 32.6 % recaptures within four months. A further comparison has been made between the effectiveness of the suture and toggle methods of tagging.

Nephrops norvegicus

Records on the catch composition of Norway lobsters have been maintained from all the main fishing grounds. A comparison has been made of the biology of the Norway lobster over the range of its geographical distribution. Preliminary experiments by otter trawl rigged with an underwater camera in the headline have given counts on Norway lobsters of up to a density of 12 per square metre. Aquarium experiments have been undertaken on the feeding of Norway lobsters.

Crangon crangon

Further analysis has been made of the data relating to the Crangon stocks in the Solway. Research-ship records of stocks of pink shrimps around Scotland have been analysed.

U.S.S.R.

(L.G. Vinogradov)

Paralithodes camtschatica

In the year 1965 the work on the acclimatization of the king crab (Paralithodes camtschatica) in the Barents Sea was continued.

Of the large crabs (breeders) released into the Barents Sea in 1965 143 specimens were caught in the Sea of Japan, 30 specimens in the Sea of Okhotsk. 91 young crabs (carapace length 8-12 cm) were introduced from the Japanese Sea.